

**P- CHANNEL DYNAMIC FLASH MEMORY CELLS WITH ULTRATHIN
TUNNEL OXIDES**

Abstract of the Disclosure

5 Structures and methods involve dynamic enhancement mode p-channel flash
memories with ultrathin tunnel oxide thicknesses. Both write and erase operations
are performed by tunneling. The p-channel flash memory cell with thin tunnel
oxides will operate on a dynamic basis. The stored data can be refreshed every few
seconds as necessary. However, the write and erase operations will now be orders
10 of magnitude faster than traditional p-channel flash memory. Structures and
methods for p-channel floating gate transistors are provided that avoid p-channel
threshold voltage shifts and achieve source side tunneling erase. The p-channel
memory cell structure includes a floating gate separated from a channel region by an
oxide layer of less than 50 Angstroms. The methods further include reading the p-
15 channel memory cell by applying a potential to a control gate of the p-channel
memory cell of less than 1.0 Volt.

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